RAPID SCATTERING SIMULATION OF OBJECTS IN IMAGING USING EDGE DOMAIN DECOMPOSITION

ABSTRACT

A complex two-dimensional layout of a photomask or other three-dimensional object is systematically decomposed into a finite number of elementary two-dimensional objects with the ability to cause one-dimensional changes in light transmission properties. An algorithmic implementation of this can take the form of creation of a look-up table that stores all the scattering information of all two-dimensional objects needed for the synthesis of the electromagnetic scattered field from the original three-dimensional object. The domain is decomposed into edges, where pre-calculated electromagnetic field from the diffraction of isolated edges is recycled in the synthesis of the near diffracted field from arbitrary two-dimensional diffracting geometries. The invention has particular applicability in die-to-database inspection where an actual image of a mask is compared with a synthesized image that takes imaging artifacts of corners, edges and proximity into account. Another application is optical proximity correction which consists of evaluating the image of every feature on a mask and improving it by introducing edge shifts and iteratively adjusting the amounts of these shifts.